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INDUSTRIAL DEVELOPMENT ORGANIZATION

ENGLISH

DIRECTORY OF SOLAR RESEARCH INSTITUTES
IN DEVELOPING COUNTRIES *

Addendum 1986

Prepared by

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ANGOLA

116. INSTITUTO DE ENERGIA RENOVÁVEIS, MINISTÉRIO DA ENERGIA E PETRÓLEOS

Rua Rainha Ginga
Luanda
R.P. Angola

Telephone: 70730/70751/70752 Telex: Cable:

Director: Mr. Felix Mathias Neto

Contact person: Mr. Felix M. Neto, Head of Institute

9 professional staff (5 PhD)

Government funded

Annual budget 1986: US\$ 300,000

Areas of research:

- Photovoltaic solar energy
- Low temperature applications of solar energy
- Wind energy
- Biomass
- Ethanol-sugar cane
- Small hydroelectric power plants
- Solar radiation measurement

Current projects:

- Photovoltaic conversion
- Solar drying
- Solar water heating
- Solar desalination
- Water pumping (photovoltaic)
- Biomass gasification and biogas

Commercialized projects:

- Solar collector
- Solar drying

Joint research programmes carried out with:

- Universidade Agostinho Neto, R.P. Angola
- A.F.M.E. - Agence Francaise Pour La Maitrise de l'Energie
- I.P.T. Instituto de Pesquisa Tecnologicas do Sao Paulo

Suggested areas of co-operation with other research institutes:

-

BRAZIL

117. CENTRO DE TECNOLOGIA - CPGEM (Postgraduate course in Mechanical Engineering)

Universidade Federal de Paraiba
58059 Joao Pessoa Pb.
Brazil

Telephone: (083) 224 7200/2186 Telex:(083)2187 Cable:

Director: Prof. Jader Nunes de Oliveira (Centre)
Prof. Severino R. De Araújo (CPGEM):

Contact person: Pío Caetano Lobo, Professor

4 professional staff (in solar energy) (PhD)

Government funded Annual budget 1986: US\$ 30,000

Areas of research:

- Solar refrigeration and natural cooling
- Solar ponds and collectors
- Solar radiation instruments and measurement
- Solar drying

Current projects:

- Solar and natural cooling
- Solar ponds
- Silica gel/water system adsorption/desorption characteristics
- Electrical equivalence phranometer
- Design procedures for drying of agricultural produce

Commercialized projects:

-
-
-

Joint research programmes carried out with:

-
-
-
-

Suggested areas of co-operation with other research institutes:

- Solar ponds
- Design and performance prediction of dryers
- Solar refrigeration and air conditioning

EGYPT

118. KHALIFA FOR ENGINEERING, CONSULTATION AND COMPUTERS APPLICATION

King Faisal City
King Faisal Road, Buildg. 7, Apt.2, 3rd floor
Giza
Egypt

Telephone:

Telex:

Cable:

Head of Institute: Dr. Adel M.A. Khalifa

Contact person: Dr. Mohsen Eniat, Technical Director

10 professional staff (3 Ph.D.)

Privately funded

Annual budget 1986: US\$ 50,000

Areas of research:

- Solar energy in general
- Energy conversation
- Computer modelling and simulation of energy systems

Current projects:

- Solar drive-in cafeteria in Cairo
- A portable Shesh Kababer driven by solar heat

Commercialized projects:

-
-
-

Joint research programmes carried out with:

- Under negotiation with Cairo University, Faculty of Engineering:
- A heat pipe solar water heater for Egypt

Suggested areas of co-operation with other research institutes:

- Solar energy applications
- Energy conservation

MEXICO

119. DEPARTMENT DE ENERGIA, CINVESTAV-IPN-MERIDA

Km.6 Ant. Carr. Progreso
A.P. 73 Cordemex.
Merida, Yuc. 97310
Mexico

Telephone: (99) 26-03-99
(99) 26-02-43

Telex: 0753654 CIEMME Cable:

Director: Dr. Alonso Fernández G.

Contact person: Dr. Roberto Uribe, Chairman of Energy

11 professional staff (6 Ph.D.)

Government funded

Annual budget 1986: US\$180,000

Areas of research:

- Uses of solar thermal energy
- Silicon, solar grade
- Photochemical storage
- Hydrogen and thermal storage

Current projects:

- Solar distillation; solar heating in fish-hatching;
- Thermochemical and catalytic processes applied to solar energy storage; H₂ systems pX-Si production by electrolysis and by direct reduction; silanes production; a-Si:H production and characterization;
- photoactivated electron transfer in organized media

Commercialized projects:

-
-
-

Joint research programmes carried out with:

- Universidad Autonoma Metropolitana-Iztapalapa, Avs. Michoacán y Purísima Col. Vicentina, C.P. 09340, Mexico City, Mexico

Suggested areas of co-operation with other research institutes:

- Photochemistry in organized media
- Solar energy storage - hydrogen systems
- Synthesis and characterization of semiconductors

NEPAL

NIGERIA

120. RESEARCH CENTRE FOR APPLIED SCIENCE AND TECHNOLOGY (RECAST)

Kirtipur Multiple Campus,
Kirtipur
Kathmandu
Nepal

Telephone: 2-14303

Telex:

Cable: RECAST

Director: Dr. K.L. Shrestha, Executive Director

Contact person: V.M. Shrestha

4 professional staff

Government funded

Annual budget 1986: US\$ 2,000

Areas of research:

- Solar cooker, drier and distillation

Current projects:

- Solar cooker

Commercialized projects:

-
-
-

Joint research programmes carried out with:

- There has been collaboration with
- GTZ, Federal Republic of Germany and JOCV, Japan

Suggested areas of co-operation with other research institutes:

- Solar cooker; solar crop drying; timber drying;
- Passive heating/cooling
- Selective coating

NIGERIA

121. SEMICONDUCTOR LABORATORY, UNIVERSITY OF IFE

Department of Electronic and Electrical Engineering
University of Ife
Ife-Ife
Nigeria

Telephone: Ife 2291

Telex:

Cable: IFEVARSITY
IFE

Director: Prof. V.A. Williams

Contact person: Dr. Titilayo A. Kuku

6 professional staff (4 Ph.D.)

Government funded

Annual budget 1986: US\$ 40,000

Areas of research:

- Silicon-based integrated devices
- Production of silicon from local quartz deposits
- PV: development of tertiary materials like Cu_2SnS_3 and Cu_2O
- Material study for solar spectral selectivity ($\text{Cu}_2\text{O}-\text{Al}_2\text{O}_3$, $\text{In}_2\text{O}_3:\text{Sn}$, $\text{SnO}_2:\text{Sb}$)
- Silicides--formation and surface characterization

Current projects:

- As above

Commercialized projects:

- Negotiating for industrial testing of some of our devices

Joint research programmes carried out with:

- Material Science Laboratory, Imperial College of Science and Technology, London

Suggested areas of co-operation with other research institutes:

- Material study for solar energy conversion
- Development of silicon-based integrated devices

PAKISTAN

122. N.W.F.P. UNIVERSITY OF ENGINEERING AND TECHNOLOGY, PESHAWAR

Department of Mechanical Engineering
P.O.Box 814
Peshawar
Pakistan

Telephone:

Telex:

Cable:

Director: Dr. Jamal Khan

Contact person: Prof. I.H. Shah

83 professional staff (3 Ph.D.)

Government funded

Annual budget 1986: US\$ 1.6 million

Areas of research:

- Solar water heating
- Solar cooker
- Solar desalination
- Solar grain dryer

Current projects:

- Solar assisted tobacco barn

Commercialized projects:

-
-
-

Joint research programmes carried out with:

- Colorado State University, USA
- Pakistan Council for Scientific and Industrial Research
- Appropriate Technology Development Organization

Suggested areas of co-operation with other research institutes:

- Selective coating
- Solar ponds
- Silicon cell

PERU

123. INSTITUTE OF INDUSTRIAL TECHNOLOGICAL RESEARCH AND OF TECHNICAL STANDARDS (ITINTEC)

Av. Guardia Civil 400 Esq. Av. Canadá
San Borja
Lima 41
Peru

Telephone: 711617 - 719058

Telex: ITINTEC Cable:
20496 PE

Director: Eng. Jorge Succar

Contact person: Eng. Benjamin Jarufe, Sub-General Director of Technology

7 professional staff (engineers) in Energy Division

Government funded Annual budget 1986: US\$ 4 million
(2% net income of industrial enterprises)

Areas of research:

- Direct use of solar energy: conversion to thermal energy at low temperature (heating and drying);
- Direct conversion to electric energy: pv cells
- Indirect use of solar energy: wind energy: water pump and electricity generation; Bioconversion energy: biogas, gasification of wood;
- Micro hydroelectric power plants

Current projects:

- Industrial solar drying, ind. solar systems for water heating;
- Electric energy from windmills; gasification of wood;
- Biogas production from organic wastes

Commercialized projects:

- One solar system for water heating in the textile industry
- Technology transfer to two factories: solar water heaters; wind mills for water pumps; solar driers

Joint research programmes carried out with:

- Universidad Nacional Ingeniería, Apart. 1301, Lima, Peru
- COFIDE, Camino Real 390, Lima 27, Peru
- CENERGIA, Av. Las Artes s/n, Lima 41, Peru
- PETROPERU, Av. Paseo de la República 3361, Lima 27, Peru
- Universidad Nacional de Piura, Piura, Peru

Suggested areas of co-operation with other research institutes:

- To receive: bioconversion energy and pv cells;
- To provide: solar heating and drying, water pumping w. windmills

SRI LANKA

124. ARTHUR C. CLARKE CENTRE FOR MODERN TECHNOLOGIES

Katubedda
Moratuwa
Sri Lanka

Telephone: 546546, 507461,
507462

Telex: Cable:

Director: Prof. Cyril Ponnamparuma

Contact person: Dr. W.T. Weerakoon, Deputy Director

12 professional staff

Government and privately funded

Annual budget 1986: US\$ 48,000

Areas of research:

- Solar energy application in industry and communication

Current projects:

-
-
-

Commercialized projects:

-
-
-

Joint research programmes carried out with:

- The above programme will be carried out in collaboration with Industrial Organizations Centre, Electricity Board and
- Telecommunication Dept. as well as the two technical universities
- in Sri Lanka

Suggested areas of co-operation with other research institutes:

-
-
-

SUDAN

125. NATIONAL ENERGY ADMINISTRATION (NEA)

P.O.Box 2649
Khartoum
Sudan

Telephone: 73315

Telex: 215

Cable: TAGA

Director: Dr. Abdel Rahman Shull1

Contact person: NEA Library

100 professional staff (2Ph.D. plus 4 Ph.D.cand.)

Government funded
USAID, AFME

Annual budget 1986:US\$ 750,000 - 1
million

Areas of research:

- Energy planning
- Energy resources
- Conservation
- Renewable energies

Current projects:

- Energy balance for Sudan
- Hot water collection for small scale industries
- Solar fridge for medicine storage in rural area

Commercialized projects:

- Biomass (5)
- Energy conservation (2)
- Planning management (1)

Joint research programmes carried out with:

- Energy Development International (E/DI/USAID)
- French Agency for Energy (AFME)
- German Agency for Energy (GTZ)

Suggested areas of co-operation with other research institutes:

- Economic costs of new technologies
- Dissemination of information on and commercialization of solar energy
- Energy management and planning

SUDAN

126. Energy Research Council

P.O.Box 4032
Khartoum
Sudan

Telephone: 70701

Telex: 24113
SREP

Cable: BUHUTH

Director: Dr. El Tayeb Idris Eisa

Contact person: Dr. Ahmed Hassan Hood, Researcher

7 professional staff

Government funded

Annual budget 1986: US\$ 100,000

Areas of research:

- Solar energy
- Biomass energy
- Wind and mini-hydro

Current projects:

- Diverse

Commercialized projects:

- Cooking stoves
- Wind mills

Joint research programmes carried out with:

- G.I.T. USA
- University of Khartoum, Sudan
- Delft University, Netherlands

Suggested areas of co-operation with other research institutes:

- Biomass
- Solar
- Wind, mini-hydro

TOGO, Rep. of

127. SOLAR ENERGY LABORATORY

University of Benin
B.P.1515
Lomé
Rep. of Togo

Telephone: 21-50-95

Telex: 5258 UNIVER-BENIN

Director: Messan Gnininvi

Contact person: Messan Gnininvi, Head of Institute

15 professional staff (2 Ph.D.)

Privately funded

Annual budget 1986: US\$ 25,000

Areas of research:

- Solar radiation measurements
- Domestic water heating,
- Cooking stoves
- Solar drying, refrigeration
- Solar pond
- Biomass; wind energy

Current projects:

- Initial operation of salt gradient solar pond
- Solar radiation measurements
- Drying crops and other agricultural products
- Flat plate collectors for domestic water heating
- Testing and research on cooking stoves

Commercialized projects:

- Domestic solar water heater

Joint research programmes carried out with:

- Togo-Benin-Ghana: West African solar radiation measurements
- Ghana: University of Ghana, Legon
- Benin: East National University of Benin

Suggested areas of co-operation with other research institutes:

- Wind energy
- Stoves
- Drying agricultural products

TURKEY

128. FIRAT UNIVERSITY

**Elazig
Turkey**

Telephone: 11904

Telex:

Cable:

**Director: Prof. Dr. Seref Kunc (Chemistry Dept.)
Dr. Asaf Varol (Mechan.Education Dept.)**

Contact person: Prof. Dr. Seref Kunc, Head, Chem. Dept.

5 professional staff (5 Ph.D.)

Government funded

Annual budget 1986: US\$ 5,000

Areas of research:

- Flat plate collectors
- Concentrating collectors
- Selective surfaces
- Solar data handling

Current projects:

- Flat plate collectors
- Concentrating collectors

Commercialized projects:

-
-
-

Joint research programmes carried out with:

- None

Suggested areas of co-operation with other research institutes:

- Concentrating collectors
- Selective surface

VENEZUELA

129. UNIVERSIDAD NACIONAL EXPERIMENTAL "FRANCISCO DE MIRANDA" (U.N.E.F.M.)

Departamento de Fisica y Matematica, Antiguo Seminario
Calle Zamora
Coro, Estado Falcon
Venezuela

Telephone: (068) 78.072
(068) 51.75.85

Telex:

Cable:

Director: Dr. Hernandez Prado, Abraham, Rector

Contact person: Williams J. Garcia O., Head of Lab. Non-conventional
1 professional staff

University funded

Annual budget 1986: US\$ 3,000

Areas of research:

- Desalination
- Distillation
- Solar radiation measurements

Current projects:

- Desalination: studies on efficiency of desalin.plant
- Radiation: study of solar radiation in Coro, Edo. Falcón

Commercialized projects:

-
-
-

Joint research programmes carried out with:

-
-
-

Suggested areas of co-operation with other research institutes:

- Desalination
- Solar radiation